"Tapping into Western Technologies by Chinese multinationals:

Geely's purchase of Volvo Cars and Huawei's hiring of Ericsson employees in Sweden"

by Ethan Gifford, Marcus Holgersson, Maureen McKelvey, and Sharmistha Bagchi-Sen

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1 Introduction

This chapter focuses on how firms can access, and tap into, relevant external knowledge for innovation, examining how this happens within two industries that are highly dependent upon scientific and technical knowledge for innovations within their products.[i] One aspect of innovation spaces in Asia is how Western companies are moving into Asia. This chapter addresses another aspect, how Asian companies are searching for, and accessing, technological opportunities and market opportunities in the West. The underlying mechanism studied is how and why Asian companies establish subsidiaries in Europe with a focus on Sweden. This chapter provides two case studies, which provide insights and understanding about two different mechanisms by which firms from emerging markets can use their establishment, networks, and resources (including human resources) as vital sources of especially technological and scientific knowledge. Specifically, these are mechanisms whereby Chinese companies can use the geographical and knowledge capabilities in Sweden. The two sectors studied are automobile and telecommunication. The chapter presents two case studies of Chinese firms moving into Sweden, including Geely's purchase of Volvo Car Corporation (VCC) in the automotive industry and Huawei's hiring of Ericsson's previous employees in the telecommunication industry.[ii] Chinese companies are increasingly moving abroad to access both advanced technologies and new markets.

Both sectors are characterized by significant spending in R&D in order to remain competitive in terms of technological developments in fast moving environments. The challenge for this type of industry – and hence for these firms – is to expand the market enough in order to reap scale economies from significant investments into R&D. The company needs to sell enough units to recuperate that investment and also generate more cash for future investments into R&D. Both sectors have faced challenges from financial crisis (e.g., the Asian crisis,

information technology related financial downturn in 2000 and the 2008 financial crisis), shortened product cycles based on technological advancements, and related developments in technical standards in telecommunication.

The studied industries are part of the Chinese 12th five year plan for national strategic emerging industries (APCO Worldwide, 2010). Chapter 1 addresses Chinese innovation policy. VCC, Geely, and the automobile industry are part of the 'new energy auto industry'. Ericsson, Huawei, and the telecommunication industry are part of the 'new generation information technology industry'.

At the national level, we can ask why Sweden is of interest to Chinese firms in these strategic industries. Our view is that Sweden can be seen as a particularly interesting national context for tapping into technological and industrial knowledge, given the high educational achievements, context of innovativeness and its long-term international orientation. Sweden is a small country of approximately nine million inhabitants at the far north of the European Union. The country combines market capitalism with a social welfare system with attributes such as free tertiary and university schooling and public healthcare for the entire population. The development of the Swedish welfare model has been closely tied to expanding access to education amongst its population. Sweden implemented wide-spread education in the late 1880s, and a major expansion of university education has more recently occurred starting in the 1970s and rapidly expanding from the 1990s.

In international comparisons, Sweden often ends up at the top of rankings of innovativeness on the national level, such as in The Innovation Union Scoreboard[iii] (European Commission, 2013). The Scoreboard has for the last several years identified Sweden as the most innovative country in Europe, labeling the country as one of few "Innovation leaders". Sweden is highly R&D intensive, with approximately 2.5% to 3.7% of GDP is spent on R&D, which consists primarily of industrial R&D. The large multinational firms are highly export oriented, within

a global economy. Many of these firms exist in the export-led industrial sectors like telecommunications (Ericsson), engineering (SKF, ABB), transportation (AB Volvo and VCC), and pharmaceuticals (AstraZeneca). Since the mid-1980s, many successful Swedish multinationals were bought and merged into industrial groups headquartered elsewhere (such as VCC into Ford and then Geely) and merged with foreign competitors (such as Astra and Zeneca forming AstraZeneca).

The first case describes Geely's purchase of Volvo Car Corporation (VCC) and challenges that arose with the new ownership. VCC[iv] is specialized in car production, with a reputation for quality and safety. As recounted in detail below, VCC has had difficulties in financing R&D and selling enough cars over several decades, leading to different ownerships before Geely. Geely has a wide range of vehicles which are sold in China but has traditionally been associated with a reputation of producing lower quality automobiles.

The second case describes Huawei's hiring of former Ericsson employees. Ericsson is an international corporation within telecommunications, and although it was initially highly successful in mobile phones (handsets) with early standards, the firm has retreated to telecommunication equipment. This industry has had frequent shake-outs of the players, due to the rapid pace of change in customer preferences (which went from high price gadgets to consumer products) and in technology (with changes in standards as well as in overlaps with other technologies). Within in a very short time, Huawei has become a major competitor in telecommunication including sub-sectors of telephones and network equipment. Huawei characterizes itself as a collective of professionals who employ a rotating CEO system under the decision rule of the board of a directors, rather than a private company (Huawei, 2011).

A key challenge for Sweden – and for small, export-led countries more generally – is how to maintain their base for R&D expenditures, either through nationally-owned companies or through attracting international R&D labs. For an international firm, Sweden then provides

access to advanced technology and skilled engineers—most of which is concentrated in Swedish multinationals. Therefore, accessing advanced technology by tapping into the knowledge of a Swedish firm can be considered as valuable for a Chinese firm – or for any firm from an emerging market. Sweden also educates many skilled engineers, who later work and obtain significant industrial and international experience.

2 Accessing New Knowledge by Tapping into Western Technologies

Our starting point is the observation that tapping into Western industries and technologies can be vital for increasing the competitiveness of firms from emerging markets like China. Learning from and imitating innovating firms and countries are important means for catching up (Granstrand & Holgersson, 2014). The extensive literature on catch-up suggests different pathways for companies from emerging markets to enhance their capabilities, and these pathways involve learning processes (Malerba and Nelson 2012; Mathews 2006a). Earlier literature assume that these firms from emerging markets initially work with mature technologies, and only at a late stage do they move from imitation to innovation.
From an innovation management perspective (Dodgson et al 2014), firms realize that they increasingly need to learn about, and develop new knowledge and technology, that can be used in product and process innovations.[v] Innovations are widely recognized as crucial for competitiveness, for both firms and economies. Decades ago, researchers would often assume that advanced technology came from the developed countries whereas the developing countries imitated or followed. Today it is not that simple. For instance, China has become one of the world leaders in terms of innovation and research and development (R&D) activities and has experienced rapid growth concerning the proportion of economic activity composed of knowledge and technology-intensive industries (National Science Board, 2014).

The question of why many Chinese firms are highly interested in tapping into technology and industries from innovative economies like Sweden relates back to the possibility to access technological opportunities through global network relationships.

Accessing knowledge resources is a type of foreign direct investment (FDI). This literature stresses that FDI is an important key element in the emergence and restructuring of spatial and organizational patterns of economic activity and received attention in economic geography, international business and other disciplines (Buckley, 2002; Peng, 2004). FDI commonly takes the form of joint equity ventures, acquisitions, mergers, or establishing or expanding operations in a host country. In recent years, the literature has examined emerging market multinational enterprises (EMMNEs). One motivation for foreign market entry by EMMNEs commonly identified is to use or learn from the location specific advantages of foreign markets to augment or develop ownership specific advantages (e.g. skills and proprietary technologies) that the EMMNEs lack (Dunning, 1995; Luo, 2000; Rugman & Li, 2007; Narula & Dunning, 2010). Augmenting resources and acquiring strategic assets, including access to knowledge and talent, can serve as a springboard for foreign market entry and further expansion through established channels of marketing and distribution (Mathews, 2006b, Luo & Tung, 2007).

China is quite active in these processes. China and Chinese companies have been frontrunners in FDI by emerging economies. Empirical evidence from DeBeule and Duanmu (2012) suggests that these firms tend to target large markets and that their main motivation for FDI is geographical expansion. According to an econometric study of Chinese investment patterns by Buckley et al. (2008, p. 136) “general market seeking motives underpin much of Chinese investment behavior”. However, Chinese EMMNEs target high-tech manufacturing companies to acquire strategic assets in form of patents and knowledge, although it is not clear whether these acquisitions impact resource augmentation if there is a lack of absorptive

capacity (DeBeule & Duanmu, 2012). According to Nicolas (2014), Chinese direct investments to the European Union have increased from USD 150 million in 2004 to USD 7.6 billion in 2011. There have been a higher number of greenfield investments, albeit lower investments, and a smaller number of more significant mergers and acquisitions.

This chapter focuses mainly on the latter aspect, how Chinese firms tap into Western industries to access new technologies to improve in-house innovativeness. Work by Granstrand et al (1993:417) stated that 'the basic aim of the traditional forms of foreign R&D was to enhance the value of existing parent-company technology. Today, a new pattern can be increasingly be discerned….many R&D units are also charged with the creation and renewal of core technological capabilities'. The case studies examined here are about tapping into existing capabilities by other firms, and thereby the acquisition of these resources is indeed intended to create and renew core technological capabilities of the Chinese firms. Two main mechanisms are identified by Granstrand et al. (1993), namely to make foreign acquisitions and to tap into a foreign scientific infrastructures.

These two mechanisms for how a foreign MNC could tap into technology correspond to the two case studies here, respectively, Geely with VCC and Huawei with Ericsson's former employees. In terms of methodology, these cases are based upon a combination of interviews (Volvo/Geely) and archival material written primarily in Swedish (Volvo/Geely and Ericsson/Huawei).

3 Geely's Acquisition of Volvo Car Corporation

On August 2, 2010 the Chinese firm Geely Holding Group acquired the Swedish automobile manufacturer Volvo Car Corporation (VCC) from the US automotive giant Ford. This acquisition was important for Geely in its ambition to build up its brand, technology base, and

engineering capabilities, which makes it an interesting example of Chinese firms acquiring Western technologies and R&D capabilities, in this case by means of corporate transactions. Geely is officially Zhejiang Geely Holding Group Co., Ltd, and its principal products are automobiles, motorcycles, engines, and transmissions. The company as of 2014 sells passenger cars under five brand names: Emgrand, Englon, Geely, Gleagle, and Volvo. Just as any acquisition, Geely's acquisition of VCC was to large extent shaped by the history of VCC. Therefore this section starts with briefly describing the history of VCC, before looking into the specific deal in which VCC was sold from Ford to Geely.

3.1 History of Volvo cars (VCC)

Volvo's heritage traces back to 1915, when the Volvo trademark (Volvo is Latin for "I roll") was registered by the Swedish ball and roller bearing manufacturer SKF. The trademark first came into use when SKF initiated automobile production under the brand Volvo, and the first series production of cars was initiated in 1927, and the production of the first car – a Volvo ÖV4 – was finalized on April 14, 1927. Already in 1928 Volvo diversified into trucks, and the trucks became an immediate success. A few years later, in 1935, Volvo was divested from SKF and listed on the Swedish stock exchange as an independent company. In the following decades Volvo diversified further, typically by means of acquisitions, into buses, construction equipment, marine engines, and aircraft engines.

By the end of the 20th century, the management of the Volvo group decided to focus solely on commercial vehicles rather than automobiles. Therefore, what was once the core of Volvo, the passenger car business, became subject for divestment in the late 1990s, and was sold to Ford in 1999 for $6.5B. The Volvo group retained the other businesses.

Leif Johansson, who was president and CEO of the Volvo group at the time, explains why Ford became the selected acquirer: “We went through a list of different options, and believe me we have tried many different options, and we have arrived at the conclusion that Ford is the best ally, the best partner and the best owner of the Volvo car business” (CNN Money, 1999). The key idea was that Ford would integrate Volvo Car Corporation (VCC) in its Premier Automotive Group (PAG), together with the other premium Ford brands; Aston Martin, Jaguar, and Land Rover.

Ford’s president and CEO at the time, Jacques Nasser, especially acknowledged the value of VCC’s brand (Volvo), engineering, and R&D in the purchase:

> What we are really buying here is generations of hard work and dedication and brand building and ingenuity that has been put together over decades and decades […] We are buying the strength of the brand, the reputation of the brand, and we are buying a team that is incredibly best in breed in terms of its worldwide capacity and research and development […] Volvo is a premium automotive brand with unique appeal that represents a good opportunity to profitably extend our lineup. (CNN Money 1999)

Key resources that Ford acquired in the deal were thus the brand, the engineering resources (especially personnel) and the technological resources of VCC – as illustrated by the quote by Jacques Nasser above.

Hence, the Volvo trademark was clearly an important part of the purchase. However, since the brand Volvo was used both by Volvo’s car business and by Volvo group’s remaining businesses (e.g., trucks and buses), the ownership of the Volvo trademarks could not simply be transferred to Ford in the deal. Instead, the holding company Volvo Trademark Holding AB was set up, co-owned by Volvo group and VCC/Ford. The Volvo trademarks were

transferred to this holding company, and the trademarks were then (and still are) licensed to Volvo group's various businesses and VCC, respectively.

The technological resources and the related intellectual property rights (IPRs) included in the deal were owned centrally within the Volvo group before the purchase. Therefore, these assets had to be reviewed before the deal to decide how to separate the portfolio of technologies and IPRs, i.e., in order to deal with the so called intellectual property (IP) disassembly problem (cf. Granstrand and Holgersson, 2013). Typically, patents which were mainly important to passenger cars were transferred to Ford while all other patents, that is, patents mainly related to other businesses, were kept within the Volvo group and then licensed to Ford if they were also used in passenger cars. The acquired technological IP was placed within one of Ford's subsidiary, Ford Global Technologies (FGT), where ownership of the technological IP of all Ford's businesses was also collected. This integration of technologies within Ford was noticeable also in the VCC products within a few years, and in 2010 almost all Volvo cars were built on Ford platforms. The C1 platform was used for VCC's smaller cars and the EUCD platform was used for VCC's larger cars (Ibid.).

3.2 Acquisition by Geely Holding Group and assessing technological assets

In 2010, after only one decade within Ford, VCC was sold again to the Chinese firm Geely Holding Group for $1.5B, a price $5B below what Ford paid for VCC roughly ten years earlier. An important background to this deal was the global recession following the financial crisis in 2007-2008. This led to a sharp decline in the demand of cars. This crisis hit the large American automotive groups hard, and both Ford and General Motors started to divest some of their brands and parts of their businesses to cut costs and raise cash (Ford had actually initiated the divestment of Aston Martin already before the financial crisis). Ford initiated the

divestment process of VCC in 2008/2009, and Geely Holding Group was announced the preferred buyer in October 2009. Geely Holding Group already had its own Chinese automotive business, Geely Auto.[vi]

The founder and chairman of Geely, Li Shufu, argued that the acquisition would give VCC access to Geely's low-cost production and market coverage in China, while Geely Auto would gain access to Volvo's high quality brand and frontline technologies (China Daily, 2009; Fangfang, 2010). The new Chinese owners and the European management team emphasized Volvo's core values at the time of the purchase. Li Shufu stated that "this famous Swedish brand will remain true to its core values of safety, quality, environmental care and modern Scandinavian design". Stefan Jacoby, who became the CEO of VCC in connection to Geely's acquisition, stated that "our employees, suppliers, dealers – and above all our customers – can be confident Volvo will preserve its special status as industry leader in vehicle safety and innovation" (Arnott, 2010).

At the time of the purchase, VCC was not profitable, and Li Shufu expected that up to $900M would be spent in the turnaround process, aiming to reach profitability for VCC. He stated that the main issue was the large R&D costs, considering the low volumes of Volvo cars produced and sold (McDonald, 2010). The yearly sales was roughly 400 000 in the early 2000s, but only 300 000 in 2009 due to the crisis. These volumes were too small to get feasible returns from the necessary R&D investments. The automotive industry involves a high level of knowledge within many complex technologies in various areas. This, in turn, requires that the firms make large R&D efforts and partner with other firms in the industry. The industrial situation can be seen as a typical situation of economies of scale, whereby large R&D investments require large sales to reduce total average costs per unit. A potential benefit from the purchase was therefore the possibility to eventually use the same architectures and technologies in both Volvo and Geely cars.

However, Ford was restrictive in terms of how their technologies could be used after the purchase. As described above, the Volvo cars were built on Ford platforms at the time of Geely's acquisition, and Ford did not want a new major competitor on the Chinese market, especially not one that used Ford's technologies. Therefore, extensive efforts were taken in order to structure the deal to safeguard Ford's competitive position, while still allowing VCC's business to continue. In a large, complex, and technology-based businesses like this, such contracting becomes complex, and Li Shufu even expressed that the IPR contracting and negotiations (i.e., the processes of disassembling the IP) in the deal were more complicated than the price (China Daily, 2009).

The IP issues were dealt with by categorizing the relevant IP and technologies, and matching the categorization with suitable provisions, such as ownership transfers or licenses.[vii] *First*, technologies that had been developed by VCC before being acquired by Ford were to be transferred back to and follow VCC into the purchase. *Second*, technologies that had been developed after VCC was acquired by Ford were kept within Ford, while VCC received different types of licenses for the technologies that were used by its businesses at the time of the purchase. *Third*, technologies that had been developed independently by VCC during the time with Ford ownership were to be transferred to VCC, while being licensed back to Ford. *Finally*, the Volvo trademarks were kept within the joint venture Volvo Trademark Holding AB (co-owned with the Volvo group). Since VCC's 50% share of that subsidiary followed the firm in the deal with Geely, the trademark issues were fairly easily handled.[viii]

A time-line of the ownership changes in VCC since the 1990s is available in Figure 1.

INSERT FIGURE 1 HERE

Figure 1 A time-line of ownership changes in VCC since the 1990s

Although there was initially a clear separation between VCC and Geely Auto, largely due to the contracts with Ford, the firms eventually started to integrate. A couple of examples of how VCC's R&D also started to become utilized in Geely Auto can be given as indications of this new trend. *First*, VCC's head of design, Peter Horbury, was transferred from VCC to Geely in 2011, being succeeded at VCC by Thomas Ingenlath. Second, and probably more important, China-Euro Vehicle Technology (CEVT), a joint engineering and development center, was set up in VCC's hometown Gothenburg in 2013, aiming at developing the next generation modular architectures for both VCC and Geely (for B- and C-segment cars) and at transferring knowledge from VCC to Geely Auto (Pröckl, 2013). At the same time, Geely's chairman Li Shufu became more involved in the management of VCC, and the cultural integration was reportedly not entirely smooth.

Some issues related to different perceptions of future design and the 'core values' of Volvo also became more evident in media. As Shirouzu (2013) puts it: "Safe, solid and understated in a Swedish way, or an aspiring luxury brand eager to pander to a Chinese taste for excess and 'bling': that's the debate causing ripples at the top of Volvo Car Corp., which has been under Chinese ownership since 2010."

While the VCC management wanted to stick with VCC's traditional core values, including Scandinavian designs, Li Shufu emphasized the importance of adapting the designs to the Chinese market to be able to reach a goal of 800 000 sold cars in 2020. Li Shufu commented on these discussion: "It is necessary to secure that we have a clear and conscious process for the product strategy […] In that process people will have opinions, but only by having open and honest discussions is it possible to reach a wise decision on products and development" [translation by authors] (Matson, 2014).

As of 2014 the VCC management has according to Li Shufu reached a conclusion on how to move forward, and the disagreements have been put aside (Matson, 2014). In line with this progress was the opening of a new VCC production facility on 5 June, 2013 in Chengdu, China, initially used for producing a limousine version of the Volvo S60 (S60L). This in turn goes in line with the joint strategy for the future, one where Geely focuses on the mass market while VCC focuses on the premium segment, while at the same time utilizing a joint technology base. Production in China is intended to facilitate the exploitation of the market opportunities associated with the large, and growing, market for high-end automobiles.

4. Huawei hiring of human capital in relation to Ericsson

This section provides a case study of the second mechanism, 'tap into a foreign scientific infrastructure', as a way for a Chinese firm to acquire talent in Sweden. This mechanism could be seen as very broad, such as interacting with universities or engaging in open innovation. We have a more narrow focus, namely, the hiring by Huawei of talented and educated engineers in Sweden, who previously worked for a competitor, Ericsson, within the same industry. Short histories of both Ericsson and Huawei are given, due to the sudden rise of Huawei which started in 1987 as an actor in this industry in recent decades.
Figure 2 presents the main time-line for Ericsson (top) and Huawei (bottom) for the period 2001 to 2013 in Sweden. The details are provided in the next sections.

INSERT FIGURE 2 HERE

Figure 2: A time-line of Ericsson and Huawei in Sweden

A time-line of the Ericsson and Huawei since the late 1990s is available in Figure 2.

4.1 The history of Ericsson

Ericsson was founded in 1876, by Lars Magnus Ericsson[ix]. Using technologies developed by Bell, but not patented in Sweden, they quickly moved into telephones, electromechanical switches and military radio equipment. Ericsson also had two jointly owned subsidiaries through the years that are relevant here as well. The first was SRA (Swedish Radio AB); originally with ASEA, AGA and later Marconi for land mobile radio equipment and naval communications, which Ericsson later purchased and renamed Ericsson Radio Systems. The second was Ellemtel, a manufacturer of computer controlled telecommunication switches (owned together with the public company Televerket).

While always engaged in telecommunication as the primary focus, the company has shifted foci during recent decades, reflecting their responses to opportunities opening globally through new technologies and markets. In the 1970s, Ericsson had two divisions, where the largest one was involved in switching (especially for public telecommunications operators) and the smaller one for business radio communication. The business radio communication division included production of military radio equipment and consumer electronics (radio and television). At that time, about 2% of sales were in mainly military communications in products related to what later became mobile telephony. The 1980s saw the deregulation of the telecommunication industry (globally) and following that, the rapid development of different types of telecommunication operators, including ones for mobile telephony. By the late 1990s, Ericsson had shifted to 70% of sales in mobile telephony, and they had three business areas: 1) Mobile Phone and Terminals, for consumer products, 2) Infocom Systems,

providing operators with networks and services, and 3) Mobile Systems, producing mobile communication systems. Turnover also grew dramatically up through the late 1990s.

Like the automobile industry, firms in telecommunication have invested much into R&D to keep up. In the early 1990s, three separate mobile telecommunication standards were being developed. Ericsson through Lars Ramqvist, who became president and CEO of Ericsson in 1990, invested heavily in R&D, especially in Sweden. Ramqvist had previously been head of Ericsson Radio System and seen the explosive growth of mobile communications, at about 40% annual per year (Skidé, 1994:13). Ramqvist strategy was to pursue R&D and to go for all the international markets and hence develop equipment for the three major standards: "I had to explain to share-holders that I was proposing to increase R&D costs very considerably, possibly by as much as 50% a year over two years", Ramqvist says. 'We would be spending 15 times as much on R&D as on dividends at a time when recession had hit the industry and we were faced with falling profits.' *(International Management* 1994:27)

However, by the end of that decade, Ericsson faced falling sales globally, due to a variety of factors. These include the Asian crisis (late 1990s), over-investment in some markets followed by restricted access to capital for operators and vendors, lagging sales in the USA, as well as increasing competition from especially Asian competitors like Samsung and LG. The net income swung dramatically in some years. In SEK millions, Ericsson went from a profit of 21,018 million SEK in 2000 to a loss of 21,264 million SEK in 2001. They were profitable again but at a low level in 2003. Some of the losses depended upon the switches and networks that they installed for operators and vendors.

During this period, moreover, the phones (handsets) became an increasingly difficult market for them, given that Ericsson was attuned to producing phones with technical finances and high prices rather than the low cost and consumer-friendly design of new competitors. Ericsson tried to respond, by developing phones in the new Sony Ericsson joint venture,

which started in October 2001. In 2002, Ericsson reduced their R&D budget by approximately 1.1 billion USD out of approximately 7.8 billion USD on research and development, and they reduced employees (globally) by approximately 17000 individuals, including in R&D (Ahlbom, 2002). More than half of the 80 global research and development labs were closed, and a key motive was more effective innovation processes.

In February 2012, Ericsson exited the phone segment all together, when they disinvested their 50/50 mobile handset joint venture called Sony Ericsson to the Sony Corporation. "We have been in the handset business since it started so this is an emotional day for us," Hans Vestberg, chief executive of Ericsson, told the Financial Times. "On the other hand it's very logical what is happening right now, how we evolve this partnership….The whole handset industry has evolved to smartphones, and we see the market being so many more devices, not only mobile phones, using the network. So the importance of having the handset business is less (Palmer & McCarthy, 2011)." In 2012, Ericsson budget for R&D was approximately 6 billion USD, again reduced by 5-10% from the previous year (Ahlbom, 2012). Global services continued to grow as a business area during this period.

4.2 Huawei and telecommunication

Founded in 1987 in Shenzhen, China, Huawei is currently among the forerunners in telecommunications equipment manufacturing, having beat out Ericsson in terms of size in 2012 and thus securing their position as the industry' largest actor (The Economist, 2012). At the close of 2010, Huawei's international employment was self-reported as 110,000 individuals, 46% of whose job entails some degree of engagement in R&D or product development (Boutellier, 2008; Huawei, 2010). Huawei became a large domestic player in the Chinese telecommunications market roughly 5 years after its inception, and continued to gain

mainstream market share at home, eventually winning its first international contract in 1997 (Bloomberg News, 2010). Since then, it has become active in markets spanning every region of the globe. By 2000, Huawei's presence on the global telecommunications market was recognized globally (Boutellier et al. 2008), and major competitors such as Ericsson, Cisco, Qualcomm, and Alcatel began to view the company as an up-and-coming threat due to their sizeable market shares. Huawei went from competitive advantages in selling to and sharing design with the influx of domestic newcomers in the Chinese telecommunication industry to becoming the leading overall vendor in the industry (ibid.).

Though Huawei's international expansion has been felt all over the globe, its investment in Sweden is of particular interest in this chapter. One of the main challenges facing the company has been the availability of talent in terms of science, R&D, and engineering (Boutellier et al., 2008), and in Sweden, due to the location of telecommunications giant Ericsson, and its difficulties as well as the supply of trained and specialized engineers from the universities, the supply of this type of talent is in relative abundance. Since Huawei's first establishing of an international R&D facility in Stockholm in 2001, Sweden has been an attractive destination for the company. Gordon Luo, Huawei's Nordic chief officer, remarked (Ahlbom, 2013: quotation translated from Swedish by authors) that Sweden and the Swedish government "make decisions based on facts, not based on protectionism", this combined with the liberal trade politics has created what he feels is a favorable investment climate for Huawei to invest in Sweden.

Despite these statements showcasing Huawei's favorable view of directly investing in R&D in Sweden, the road has not been without hindrance, or controversy, due to competition amongst the firms. Global competition between Sweden's telecommunications giant Ericsson (along with its joint ventures, Sony-Ericsson and ST-Ericsson) and Huawei has intensified in recent years, not least in terms of service contracts in target markets, both geographical and

technological. Additionally, much of Huawei's strength in the Swedish market could, we argue, stem from its hiring of former Ericsson personnel who have experience in key technological fields related to core business areas that Huawei is already in or is entering into. Since its entrance into Sweden in 2001, Huawei has been acquiring a wealth of R&D knowledge through the hiring of employees and managers who have built up competence in key areas while working for Ericsson or one of Ericsson's joint ventures. Many previous Ericsson employees have found themselves lacking in gainful employment, during cut-backs, which was something that Huawei may have been quick in offering, and others may have been offered more favorable conditions.

This ebb and flow process of competition is deserves further research, and the next section will map the activities of Ericsson, and the hiring and expansion of Huawei, in Sweden's three main IT/telecommunication clusters, namely Kista (a district of the Stockholm municipality), Lund (near Malmö), and Gothenburg. These are the three main metropolitan areas of Sweden, and centers for Ericsson R&D. The next section will focus on the establishment of Huawei's subsidiaries in these locations and how some of their business areas match those of Ericsson on a region by region basis.

4.3 Huawei's strategic regional co-location to R&D knowledge in Sweden

Three regions are discussed in turn – Kista, Gothenburg and Lund – in relation to Huawei's strategic co-location to R&D knowledge in Sweden.

Lying on the edge of the Stockholm municipality, Kista is one of Sweden's largest industrial districts for these technologies. It has been and remains an important area of operations for Ericsson, as well as Stockholm centrally. The Kista operations began to grow exponentially

during the IT boom of the late 1990s/early 2000s. The core competence of this area of Ericsson's business lay in wireless communications and information technologies.

Huawei first established its own Kista-based R&D facility in 2001. As of 2010, this business unit focuses on several key technologies, including mobile system design, algorithm/IRF design, and chipset design (Huawei, 2010). In March, 2007, Urban Fagerstedt, an Ericsson employee of 28 years, went to work at Huawei. He split his time working as manager of the R&D office in Kista, in the Stockholm area, and as a management consultant for Huawei's management board in China. He left Ericsson in winter, 2004, when the Swedish telecom giant reorganized large portions of its R&D activity. He spent the last 4 years at Ericsson as head of development of radio systems, an area that then stood for 65% of Ericsson's sales (Ahlbom, 2007). He now supplies key knowledge and skills within his areas of expertise to Huawei.

In addition, Jack Järkvik was pointed out by Fagerstedt as a person holding key engineering competence who now takes part in training the Chinese portion of Huawei's R&D staff how to effectively organize and run project within research and development. Järkvik, during his time as an Ericsson consultant, helped develop the concept of System Anatomy, which became a widespread analytical tool in R&D projects both in Ericsson and other major competitors. While expressing Huawei's interest in pursuing human resource opportunities further in Sweden concerning R&D, Fagerstedt hinted that he knew where the key personnel were located in the Ericsson corporate hierarchy that are best within Huawei's area of interest, though he would never contact them and encourage them to come over to the Chinese contender. "It's not my style, and would be very immoral. However, should they send me their résumé, that's something else altogether" he told *Ny Teknik* (from Ahlbom (2007): translation from Swedish by authors).

In the year that followed, Ericsson did not appear (from observed press correspondence) to favor the growing interest Huawei was taking in their current and former employees. There was an ensuing war of words in the press and of publicly stated intentions concerning the movement of key industry knowledge via personnel from Ericsson to Huawei. In late 2007 it was made public via an Ericsson employee that the Swedish company had conducted a mapping procedure regarding former and current employees who had gone to work for Huawei. The mapped information included subjects such as family, friends, economic standing, and free-time activities. This information then found its way into reports compiled within the company (Aftonbladet, 2007;Fröberg, 2007).

Henry Sténson, Ericsson's director of communications during the event, was candid about how Ericsson viewed the competitive development between the two companies was developing in Sweden, calling it a "surgically precise" acquisition of key personnel. "Many of our employees are angry about how Huawei is behaving. They lure people with salaries up to 50% more than what we are able to pay. Their acquisitions are a threat to jobs at Ericsson."

As introduced above, Urban Fagerstedt was one of the mapped former-Ericsson employees who had gone over to Huawei. He maintains that he receives neither higher wages nor that Huawei was actively attempting to poach key personnel from Ericsson (ibid.).

Since establishing the group's first international R&D facility in the Kista, Huawei has been aggressively starting new R&D facilities in Sweden as well as globally. The next major step for Huawei in Sweden occurred on the country's west coast, in Gothenburg.

In the fall of 2009, Huawei established yet another Swedish-based subsidiary, this time in Gothenburg, the country's second largest city. Here, Huawei's decision to co-locate their own activities with Ericsson competence areas and personnel is noteworthy and can be more specifically related to the technological competencies in the region.

INSERT FIGURE 3 HERE

Figure 3: Microwave technologies in the Gothenburg region

Figure 3 provides an overview of the key knowledge base in the Gothenburg region in microwave technologies, between Ericsson and Saab.

Gothenburg has a concentration on microwave technology, as visualized in Figure 3.

In the Gothenburg metropolitan area, Ericsson's regional offices had traditionally worked with microwave technology relating largely to military and civilian communication, as well as with wireless technologies. Concentrated on this area, a specific joint venture of note occurred with the between Ericsson and the Saab concern. Saab Ericsson Space was founded in 1992, combining Saab's computer technology and mechanical systems with Ericsson's expertise in microwave equipment. In 2006, after a reorganization of the Ericsson's Gothenburg-based activities, the Ericsson-owned military communications unit was mainly sold to the Saab concern thus ending the joint venture, while Ericsson retained ownership of their civilian communications technology, of which microwave and base station technology played a key role (RUAG Space Sweden, 2001; Ericsson, 2006).

In 2009, Huawei opened and their research orientation in Gothenburg is directed towards three types of technology: General development of base station technology, and development of microwave products and core network technology (Ahlbom, 2009). There is a close match to Ericsson's (and Saab's microwave division) competences in the area.

Moreover, in terms of leadership, Huawei has recruited Mats Andersson as site and system manager of radio base systems in Gothenburg. Andersson was formerly systems engineer, senior research engineer, project manager, department manager, and general manager at

Ericsson from 1986-2006. Additionally he was an antenna engineer from 1982-1983.
Andersson led Saab-Ericsson's Space antenna department from 1995-1998.
The southern city of Lund near to Malmö has also been a key location for both Huawei and Ericsson.

INSERT FIGURE 4 HERE

Figure 4: Chip and mobile platform technologies in the Lund region

Figure 4 visualizes Ericsson units in the development of chip and mobile platform technologies in Lund.
Lund has been the site of two joint ventures, between Sony and Ericsson and between Ericsson and ST Microelectronics, and both were later dissolved.
Sony and Ericsson created their joint venture Sony Ericsson in 2001 for phones. At that time, Ericsson did not include the transfer of handset core technology (chipset technology), or its core R&D in this area, in the arrangement. This division of Ericsson would later become a separate subsidiary of Ericsson, namely, Ericsson Mobile Platforms (EMP). This company then licensed its technology to Sony Ericsson along with various other actors in the mobile telecommunications industry worldwide. Ericsson's main non-developmental contributions to the joint venture were then general excellence in mobile telecommunications, business infrastructure knowledge, and operator relations (Sigurdsson, 2004).Later, EMP became part of Ericsson's joint venture with the Swiss-based ST Microelectronics, becoming ST-Ericsson. This company maintained its operations in Lund, Sweden, in the area of chipset technology. When this joint venture was dissolved, the area of modem technology was re-appropriated

into Ericsson, while ST Microelectronics reassumed portions of the joint venture's wireless business.

Both joint ventures in Lund have been affected by layoffs, and have both since been dissolved. During 2010, the two joint ventures were forced to make substantial personnel cuts, about 450 from Sony Ericsson and 150 from ST-Ericsson (Ahlbom, 2010) (also, see appendix). In 2011, Sony Ericsson became a full subsidiary of Sony Mobile, with Ericsson selling its shares to Sony. Although Ericsson sold all of its assets in the joint venture, Sony Mobile and Ericsson set up a cross-licensing agreement concerning wireless connectivity for a variety of platforms (Ericsson, 2012 (annual report)). Sony Mobile announced in late 2012 that it would relocate its head of operations from Lund to Tokyo, resulting in around 1000 employees in Lund being laid off. In fall of 2013, the dissolution of ST-Ericsson left roughly 400-600 employees affected, with an estimated layoff of 290 employees in the Lund area (Kalin, 2014). Between 2010 and 2013, both joint ventures reduced their head count by a total of between 2100 and 2300 employees in engineering and consulting related fields.

Thus, an abundance of skilled and experienced engineers with competence in chipset technology, platform design, and operational and infrastructural knowledge who had worked (and presumably most also resided) in the Lund area were available in the form of ST-Ericsson and Sony Mobile employees. Huawei established its own Lund R&D facility in early 2010, around the time of the first wave of layoffs by Ericsson's joint ventures. Huawei's Lund centre is involved in "the development of mobile phones; technology that is closer to platform development than to applications" (ibid).[x] It is expressed via Huawei's (2012) Europe fact sheet that the Lund centre is involved in "terminal chipset design."

5 Conclusions and Implications

This chapter has analyzed how firms access and develop knowledge and opportunities across innovation spaces. The cases are Chinese firms (Geely and Huawei), which have undertaken investments in Sweden which a specific focus on human capital and knowledge, specifically to access managerial, business, market, scientific and technical knowledge.

Opportunities and challenges are discussed as well. These come to the forefront with Geely's acquisition of VCC which is motivated by a need to tap into talent in technological and industrial fields in Sweden, a country and its multinationals known for high technology and high quality products and processes. VCC was purchased in 2010. Approximately 20 000 people work within VCC, and Geely accessed individuals with engineering and production experience, as well as patents, brands, other IPRs and production facilities. Thus, a key opportunity is the possibility to acquire such assets, but there was also the need to invest significant amounts of capital by Geely. Financial capital is a generic challenge for the automobile industry, which needs a continuous flow of cash to undertake R&D and innovation. In this case, the Chinese entrepreneur who is chairman of the holding company can access significant amounts of capital. Another challenge is the need to carefully disentangle the intellectual property and platforms between VCC and their previous owner Ford, who did not want a new competitor in China using Ford technology. VCC was previously owned by Ford, and a major aspect of the purchase and later integration was how to address complex property rights (IPR, brand, platforms) sharing bamong the three companies. The final challenge is the problems related to differences in perception about the tastes and demands of future and current customers, which in this case was formulated as safety, reliability and Scandinavian known as elegant but minimalistic design contrasted to design which appeals to Asian high-end ostentatious and conspicuous consumption consumers. The reports in the media suggest that a compromise have been met, but differences will continue to be debated in the future.

Similarly, opportunities and challenges are visible in the Huawei case as well , when they acquired talent as well as technological and industrial knowledge in Sweden from Ericsson. Usually, the mechanism of accessing a foreign scientific infrastructure could be thought of setting up R&D centers, engaging in university-industry collaboration or other forms of open innovation. Here, we have added a new type of mechanism, when the company established co-located R&D centers with Ericsson centers to hire former employees of their rival. Huawei set up its first Swedish R&D lab in 2001, about the time that Ericsson started having severe economic problems, downsizing R&D and moving phones (handsets) to a joint venture with Sony. The main opportunity for Huawei has been to strategically hire key employees from a leading competitor, especially during times of intense global competition. Huawei has acquired many key employees and managers from Ericsson in almost every strategic area of importance to a value chain such as supply chain and logistics, to R&D and innovation project management, to development of radio systems and mobile technology.

One challenge from a company perspective is that Huawei needed to spread the R&D sites around Sweden, in order to co-locate the R&D sites with Ericsson's sites and its joint ventures in Stockholm/Kista, Gothenburg and Lund. This is to benefit from the potential new employees and previous Ericsson employees' preference of locations. It would be much more difficult in the initial step and at this scale to hire when this necessitates a move to China and a complete change of lifestyle for the employee and its family. Once hired, many employees have moved to China for some years, as also happens in the Volvo Cars case. A related challenge has been to create a culture within Huawei's Swedish organization that attracts Swedish personnel. Given that Huawei expanded into areas – both geographically and technologically – that mirrored the investments made previously by Ericsson, Huawei could more easily hire people with technological and industrial experience, in the core technologies needed for telecommunication.

The Chinese firms, while keeping their headquarters in Asia, have used, respectively, foreign acquisition and hiring former employees, as mechanisms to link the innovation space of Sweden with that of China. Thus, these cases provide understanding of how Chinese companies access technology, human capital, and markets from Sweden and thereby expand the resources and opportunities available to companies located in innovation spaces in Asia.

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Endnotes

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[ii] The case studies are here provided as illustrations, and they are based on archival and social media material for both case as well as also interviews for the Volvo case.

[iii] Previously known as the European Innovation Scoreboard.

[iv] The brand ‘Volvo’ is shared with AB Volvo, which makes trucks, heavy equipment, etc.

[v] Innovation used to be synonymous with R&D intensive and high tech products sold on a market, but the modern conceptualization is more complex and including many other types of innovations, services, bundles of services and products and innovations for consumers with low wages, known as base-of-pyramid (Dodgson et al., 2013).

[vi] According to their website in 2014 “Geely Automobile Holdings Limited is an automobile manufacturer, focusing on development, manufacturing and sales of passenger vehicles. The Company’s shares are listed on the main board of Hong Kong Stock Exchange; the controlling shareholder of the Company is Zhejiang Geely Holding Group Company Limited, a private company which is wholly-owned by Mr. Li Shu Fu, the Company’s chairman, and his associate. With its headquarter established in Hangzhou and nine manufacturing plants in Linhai, Ningbo, Luqiao, Shanghai, Lanzhou, Xiangtan, Jinan, Chengdu and Cixi in China, the Company has a total annual production capacity of 625,000 units of vehicle per shift by end of 2012.”

[vii] Note that most IP and technologies had been collected within FGT during VCC’s time within Ford, as described above.

[viii] See Granstrand and Holgersson 2013 for a more thorough description of the management of the IP disassembly problem in this case.

[ix] This company overview is based upon McKelvey et al 1998

[x] In Swedish, “grundutveckling av mobiltelefoner, teknik som är närmare plattformar än applikationer” (ibid., author’s English translation, quotation from Urban Fagerstedt).

Figure Error! Main Document Only. **A timeline of ownership changes in VCC since the 1990s**

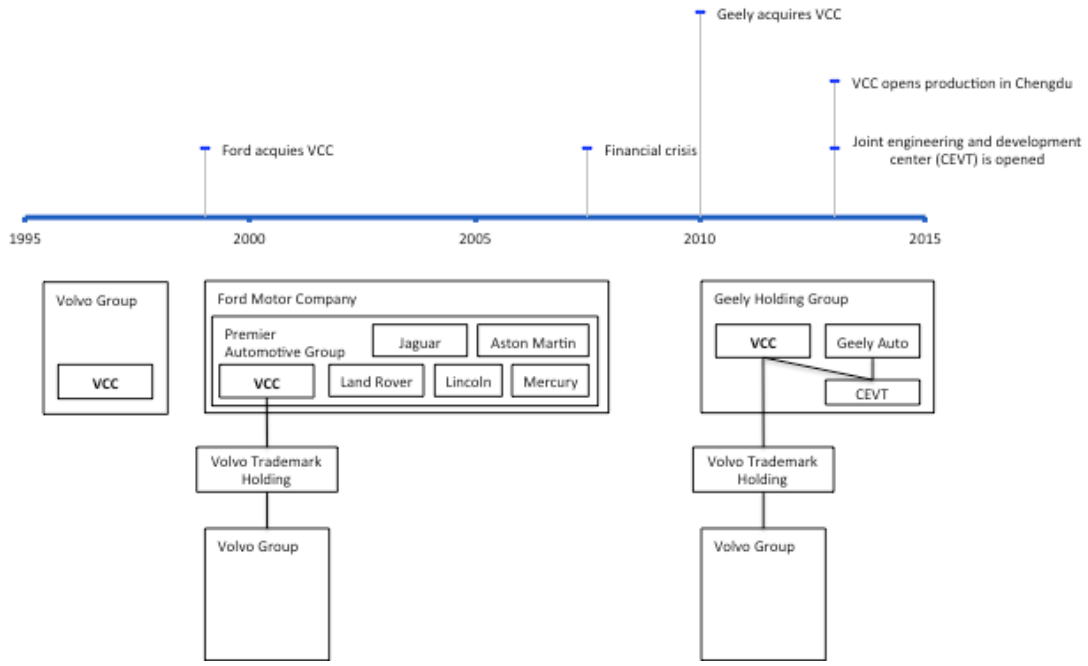


Figure 2: A time-line of Ericsson and Huawei in Sweden

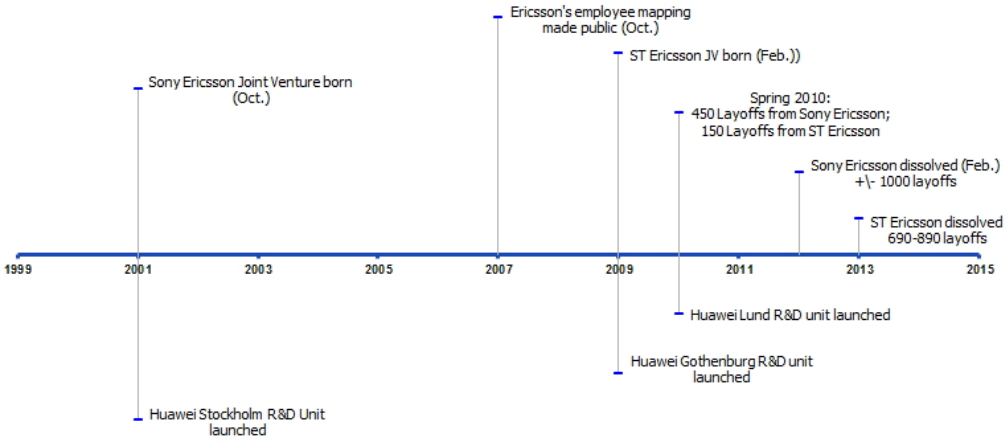


Figure 3: Microwave technologies in the Gothenburg region

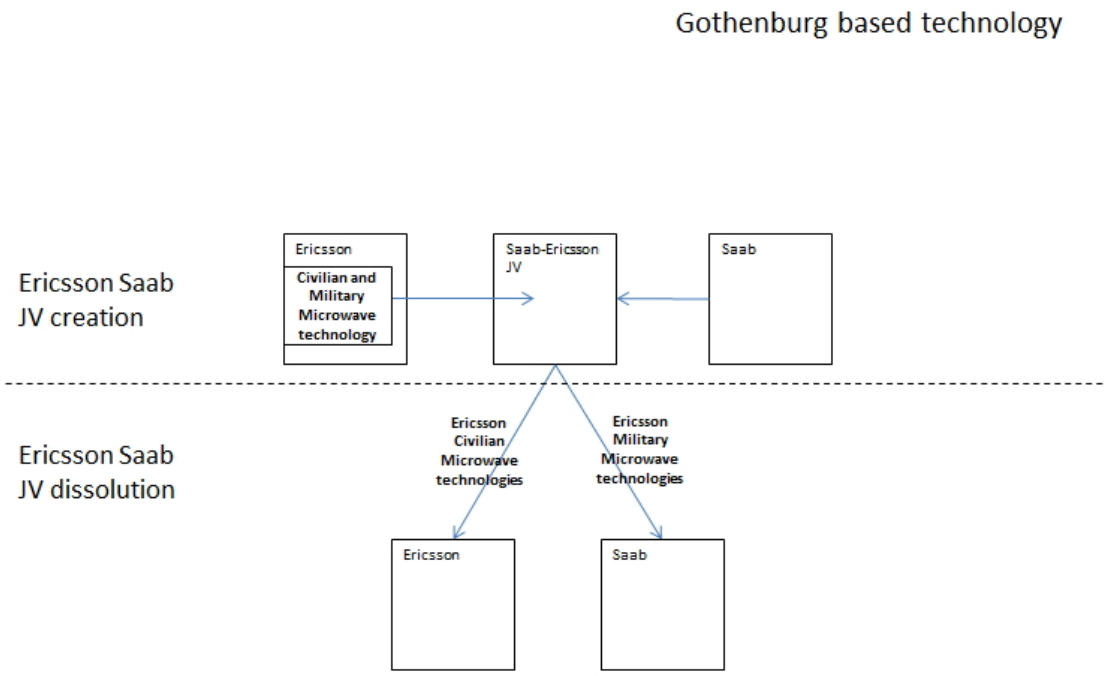
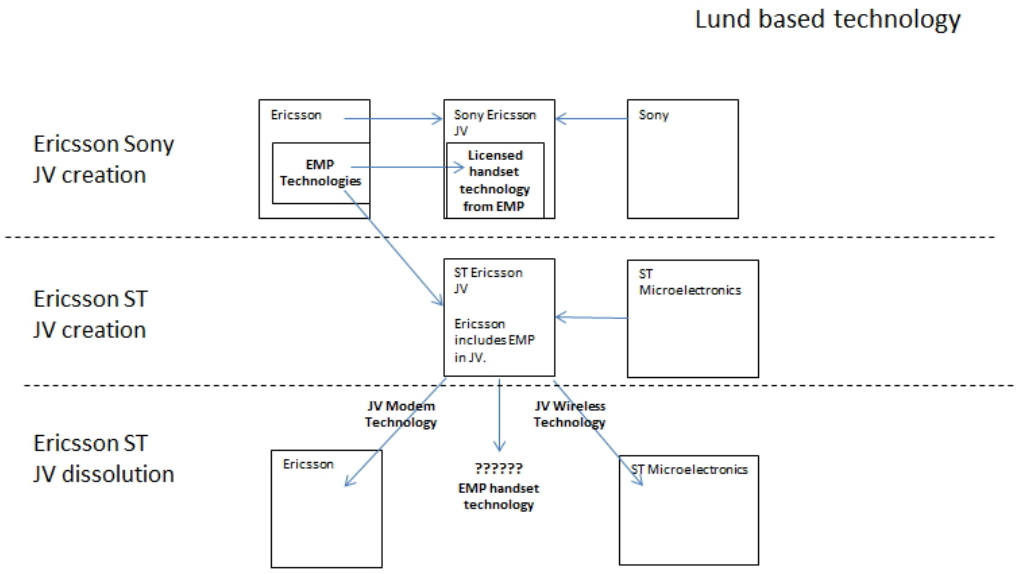


Figure 4: Chip and mobile platform technologies in the Lund region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